

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet).

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/B2004/001013

International filing date (day/month/year)
31.03.2004

Priority date (day/month/year)

International Patent Classification (IPC) or both national classification and IPC
H01R4/68, H01L39/24

Applicant
COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2004/001013

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2004/001013

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-9
	No: Claims	
Inventive step (IS)	Yes: Claims	1-9
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-9
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)

International application No.

PCT/IB2004/001013

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

- D1: JP 05 043341 A and corresponding PAJ
- D2: JP 06 163255 A and corresponding PAJ
- D3: JP 06 140234 A and corresponding PAJ
- D4: JP 06 045141 A and corresponding PAJ
- D5: JP 04 255203 A and corresponding PAJ
- D6: US 6 216 333 B
- D7: US 5 480 728 A

2. The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and shows (see Fig. 4 and para. [0006] to [0010] of D1) a process of preparing an electric contact to a high-temperature superconductor rod (4), the process comprising depositing a first silver layer (5) by metal vapour deposition on an end portion of the superconductor, wrapping a silver foil (6) on said first silver layer, and heating the two-layer combination at a temperature of 500-900 °C for 10-100 hours resulting in a joint with the superconductor having a low contact resistance.

The subject-matter of claim 1 differs from this known process mainly in that a three-layer contact is formed on the superconductor having a groove, the three-layer structure consisting of a first silver layer deposited by metal spray gun deposition at 120 °C and heat treated at 200-250 °C for 2-5 hours, a perforated silver foil wrapped on said heat treated first silver layer, and a second silver layer deposited by metal spray gun deposition at 120 °C.

The subject-matter of claim 1 is therefore new (Article 33 (2) PCT).

The problem to be solved by the present invention may be regarded as providing an improved electric contact to a high-temperature superconductor bulk body having further reduced contact resistance.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33 (3) PCT) for the following reasons:

None of the presently available prior art documents discloses or fairly suggests a three-layer contact to a high-temperature superconductor having a perforated silver foil sandwiched between two silver layers formed by thermal metal spray gun deposition. More specifically, the document D2 discloses a two-layer contact including a perforated silver foil wrapped around the end portion of a high-temperature superconductor rod and a silver layer deposited by spreading a silver paste on slits of the silver foil and sintering the two-layer combination at 845 °C for 48 hours. Even a combination of the teachings of D1 with D2 would therefore not result in a second silver layer formed by metal spray gun deposition.

The document D3 discloses the manufacture of an electrode on a high-temperature superconductor comprising cutting grooves at the end of the superconductor and depositing a silver layer on the groove-cut part by thermal spraying of silver. A thin silver tube is then press-bonded to the silver-coated end portion of the superconductor. The document D4 discloses a multilayered silver electrode on a high-temperature superconductor formed by spraying a first silver layer, performing a heat treatment, and spraying a second metal on the heat-treated first silver layer. D4 does not disclose any wrapped silver foil.

Also the other documents cited do not come closer to the inventive process than D1.

3. Claims 2-9 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Re Item VII

Certain defects in the international application

1. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 and D2 is not mentioned in the description, nor are these documents identified therein.
2. The features of the claims are not provided with reference signs placed in

parentheses (Rule 6.2 (b) PCT).

Re Item VIII

Certain observations on the international application

1. A lack of clarity (Article 6 PCT) arises in claim 1 because the term "low contact resistance" is a relative term which does not clearly and unambiguously define the intended range of contact resistances.

Furthermore, it is not clear on which part of the superconductor the contact is positioned. There is not relation between the groove at the end and the contact.